

December 12, 2002

**Memorandum of Understanding Among Cable MSOs and Consumer Electronics  
Manufacturers**

*This Memorandum of Understanding sets forth the basic principles which are incorporated into final documentation for private sector undertakings, for submission to the FCC including recommendations to be used in a rulemaking process and, as necessary, for submission to Congress for appropriate implementation.*

**1. Executive Summary:**

- 1.1 As the result of a series of meetings among the Parties (Cable Multiple System Operators ("MSOs"), Consumer Electronics Manufacturers ("CE Manufacturers") and the Consumer Electronics Association ("CEA")), facilitated by the National Cable & Telecommunications Association ("NCTA") and CEA, this Memorandum of Understanding ("MOU") has been reached which summarizes the framework for the set of documents to be submitted to the FCC including recommendations to be implemented as regulations and, as necessary, to Congress for appropriate implementation. Some of the elements of this understanding are private sector undertakings.
- 1.2 No conditions or obligations will be placed on the Parties except for those which are explicitly called for in this MOU.
- 1.3 This MOU constitutes a system that necessarily relies on all its parts to provide consumers with solutions to cable and CE issues affecting digital television. Should any part of this MOU not be implemented as proposed, or if additional obligations are imposed on a Party, each of the Parties reserves its right to withdraw support for any implementation.
- 1.4 This MOU primarily addresses -- and the final agreed-upon documentation primarily addresses -- "Unidirectional Digital Cable Products." i.e., unidirectional ("one-way") DTV products, although further discussions will be held to address "Advanced Interactive Digital Cable Products." i.e., interactive, "two-way." DTV products. These Unidirectional Digital Cable Products may be televisions, set-top-boxes, recording devices, and other devices without limitation.
- 1.5 The Parties agree to jointly submit and support consensus proposals arising out of this MOU for implementation by FCC regulations and, as necessary, for implementation by Congress through legislation. The Parties will endeavor vigorously to obtain the support (or non-opposition) of associations and other groups for this MOU. The Parties agree that other provisions of this MOU may be implemented by them without either FCC or Congressional involvement.
- 1.6 This MOU does not restrict or preclude private agreements between or among any of the Parties.

## **2. DFAST TECHNOLOGY LICENSE AGREEMENT**

- 2.1. The DFAST Technology License Agreement For Unidirectional Digital Cable Products (which is enclosed as part of this package) (hereinafter the "DFAST License Agreement") provides a license to use the DFAST scrambling technology for the POD-Host Interface. It is a standard commercial IP license for the DFAST technology for use in Unidirectional Digital Cable Products. It includes compliance and robustness rules that do not impose on a licensee any requirement, either directly or indirectly, other than those that are necessary to protect the security of the POD interface, prevent theft of service, avoid harm to the cable network and provide agreed content protection consistent with the encoding rules proposed for adoption by the FCC. Individual CE Manufacturers may negotiate other licensing terms for such technology (such as in CableLabs' PHILA) with CableLabs. The DFAST License Agreement authorizes the revocation of the POD authorization for products which do not adhere to the requirements specified in the license. The DFAST License Agreement includes a most favored nation clause under which CableLabs shall make available to licensees any license terms offered as to DFAST technology made available to any or all manufacturers of Unidirectional Digital Cable Products pursuant to the DFAST License Agreement.
- 2.2. The Parties agree to publicly advocate the elimination of any MVPD device obligation to respond to commands as to selectable output controls and the observance of the same encoding rules as called for herein in all digital delivery systems, including Satellite and Internet systems. The DFAST License Agreement does not impose obligations to respond to selectable output control or down-resolution commands in the operation or implementation of the POD technology in the licensed devices. The compliance obligations under the DFAST License Agreement shall be subject to the mutually supported encoding rules submitted to the FCC for implementation. This section also contemplates that the FCC will enact a prohibition eliminating selectable output control for all MVPDs. In the interests of reaching agreement, and recognizing that public policy changes to enact encoding rules and to eliminate selectable output control for digital delivery systems other than MVPDs may take an extended period of time, the Parties agree that this MOU is contingent on the enactment of encoding rules and elimination of selectable output controls for MVPDs only.
- 2.3. The Parties have jointly developed proposed consensus encoding rules that are (1) based upon and generally consistent with the principles and policies of Section 1201k of the Digital Millennium Copyright Act of 1998 and the DTCP/5C license; and that (2) contain a process providing for the launch of new business models, subject to review by the FCC. These encoding rules are included with this package for prospective implementation by the FCC. The Parties have agreed that, while rules for encoding content that are substantially similar to those embodied in the 5C Agreement are acceptable to them for current business models, the consensus encoding rules that the Parties will ask the FCC to adopt need to include a process that is different from the 5C process for addressing new and as-yet-undefined business models and for changing the encoding rules for new services within defined business models. As a result, a new

change method, and evaluation criteria for updating encoding rules, are described in the encoding rules proposal to the FCC that is part of this package.

- 2.4. The Parties are jointly submitting and supporting a proposal for consensus encoding rules (which is enclosed as part of this package) for implementation by FCC regulations and are jointly submitting and will support a proposal for consensus encoding rules, as necessary, for implementation by Congress through legislation, as detailed in Section 2.3
- 2.5. The DFAST License Agreement contains provisions allowing for liability for the willful and bad faith failure to follow the compliance and robustness rules. however such liability will be limited to avoid "windfall" "piling on" legal actions, and maximum liability amounts are stated, and reasonable. An additional provision includes mechanisms to limit legal costs and attorneys' fees.
- 2.6. The DFAST License Agreement is to be royalty free, and will require a one-time license fee not to exceed \$5,000 for administration costs.
- 2.7. The DFAST License Agreement does not restrict application of the POD Host Interface and technology to any product that meets its requirements. MSOs will not withhold or otherwise limit the availability of PODs to cable customers for any Unidirectional Digital Cable Product that meets the requirements of the DFAST License Agreement, with the exception that a POD technology may sunset as provided for in this MOU. CE Manufacturers, through confidential reports provided to and consolidated by CEA, agree to provide CEA with confidential production forecasts that will be aggregated by CEA and thereafter used by CableLabs to inform MSOs in advance of the number of POD enabled products entering the marketplace. CableLabs will provide the aggregate unit volume reports from CEA to MSOs for their planning. MSOs and CableLabs agree to keep this information confidential at all times. CE Manufacturers agree to provide such monthly forecasts for a rolling five-month period for five years from the month of self-certification of the first compliant product. This information will be provided so that MSOs can anticipate potential POD demand.
- 2.8. The DFAST License Agreement does not include within the License any requirement for testing or certification of compliance. The Parties have agreed to provisions for interoperability testing and certification which are addressed in Section 3.7 of this MOU.
- 2.9. The DFAST License Agreement contains a field-of-use restriction barring its Implementation on Advanced Interactive (two-way) Digital Cable Products. This field-of-use restriction will remain in effect until December 31, 2005, and thereafter unless appropriate regulations and legislation are then in effect that subject all MVPDs (including DBS), telephone and DSL providers, Internet and other competing technologies for the distribution of video to the same encoding rules (including rules applicable to the use of selectable output controls and down-resolution). It is further agreed that should a CE Manufacturer reach a separate DFAST License Agreement which eliminates this field-of-use restriction, such agreement will be open to any CE Manufacturer under the "Most Favored Nations" (MFN) clause, and any changes in such an agreement will also flow to CE Manufacturers who desire it under the same MFN

clause. If the Parties are unable to reach agreement on requirements for Advanced Interactive (two-way) Digital Cable Products by December 31, 2005, then any Party may pursue independent solutions from the FCC and Congress.

**3. Unidirectional Digital Cable  $n$  ( $n$  = TV, Tuner, etc) Product Definition (This is a one-way cable product)**

- 3.1. The Parties will agree upon a recognized proposed primary term for the products addressed in this MOU. The Parties agree that application of this term to the product, packaging and related materials is voluntary, but the Parties are encouraged to use this name to promote consumer awareness.
- 3.2. The Parties will agree upon a recognized proposed supplementary term for the products defined below, which are additionally equipped with a secure digital interface (as specified in Section 3.6 below). The Parties agree that application of this term to the product, packaging and related materials is voluntary, but the Parties are encouraged to use this name to promote consumer awareness. When used, this term should be used in context with the primary term to avoid consumer confusion.
- 3.3. The Parties agree to not trademark either of the above terms, thus agreeing to not exercise any control over their application and use, or may agree to jointly trademark these terms without compensation and therefore ensure via license terms that these terms are only used to describe products defined herein. Should any Party already own a trademark or other legal right to the above terms, it agrees to drop all claims to such rights, provided that such Party consents to have the term in which it owns a trademark or other legal right used as the aforementioned term.
- 3.4. Cable Services Accessed (Minimum):
  - 3.4.1. Analog and Digital Services in-the-clear (including basic and tiered cable services)
  - 3.4.2. Scrambled digital services via POD **CA** system (including basic, tiered and premium cable services)
  - 3.4.3. Call-ahead pay-per-view (PPV) if supported by cable operator.
  - 3.4.4. Channel Navigation using channel map and associated text label from cable network.
  - 3.4.5. These products do not access video-on demand (VOD)
  - 3.4.6. These products do not access impulse pay-per-view (IPPV).
  - 3.4.7. These products do not utilize the return path of the cable system.
  - 3.4.8. These products do not use MSO provisioned EPG program schedule information from the cable network. In this respect, MSO provisioned EPG program schedule information does not include PSIP data provided under the terms of the February 2000 NCTA/CEA PSIP agreement.
  - 3.4.9. These products can receive PSIP data in-band pursuant to the terms of the February 2000 PSIP agreement.
  - 3.4.10. Certain products (described in Section 3.6 below) will provide for an interface for connection to future advanced cable set-top-boxes and other products.

### 3.5. Summary Technical Description

- 3.5.1. Tune the NTSC analog channels that are transmitted in-the-clear.
- 3.5.2. Tune digital channels that are transmitted in compliance with SCTE 40 2001 as amended by DVS/535 (as of 10/29/02), including both in-the-clear channels and channels **that** are subject to conditional access.
- 3.5.3. May navigate channels based upon (a) channel information (virtual channel map and source names) provided through the cable system in compliance with ANSI/SCTE 65 2002 (as of 10/29/02) (this is limited to channel numbers and associated text labels) and/or (b) PSIP-enabled navigation (SCTE 54 2002 as amended by DVS/435r4) (as of 10/29/02)
- 3.5.4. Include the POD-Host Interface, specified in SCTE 28 2001 (as of 10/29/02) as amended by DVS/519r2 (as of 11/05/02) and SCTE 41 2001 as amended by DVS/301r4 (as of 10/29/02) or implementation of a more advanced POD-Host Interface based on successor standards. The use of a successor POD is optional (except that a POD subject to sunset as provided herein cannot be employed), but when available its use is encouraged. The Parties will cooperate in having the POD specifications approved by an ANSI-accredited standards setting organization.
- 3.5.5. Responds to Emergency Alerts that are transmitted in compliance with ANSI/SCTE 54 2002, as amended by DVS/435r4 (as of 10/29/02).

### 3.6. Digital and 480p Interfaces (DVI and HDMI, both of which include HDCP, are considered interchangeable at the CE Manufacturer's option):

- 3.6.1 The Parties have committed to recommending to the FCC a labeling regime as to interfaces that anticipates deployment of DVI or 480p Y,Pb,Pr interfaces. CE Manufacturers and CEA are supportive of this recommended labeling regime and of the expectations of MSOs with respect to delivering services and features, through these interfaces, to consumers as a result of the recommended package, including these regulations. Under the recommended labeling regime, CE Manufacturers shall be required to employ DVI or 480P Y,Pb,Pr interfaces (as a minimum) as follows on Unidirectional Digital Cable Televisions (nor other Unidirectional Digital Cable products):
  - 480i grade televisions -- none
  - 480p grade televisions -- as follows (either DVI or HDMI with HDCP, or 480P Y,Pb,Pr interfaces -- CE Manufacturer's choice):
    - With screen sizes 36 inches and above -- 50% of a manufacturer's models offered for sale effective July 1, 2004; 100% of such models effective July 1, 2005.
    - With screen sizes 32 to 35 inches -- 50% of a manufacturer's models offered for sale effective July 1, 2005; 100% of such models effective July 1, 2006.
  - 720p/1080i (HD) grade televisions -- as follows (either DVI or HDMI interfaces with HDCP -- CE Manufacturer's choice).
    - With screen sizes 36 inches and above -- 50% of a manufacturer's models offered for sale effective July 1, 2004; 100% of such models effective July 1, 2005

- o With screen sizes 25 to 35 inches -- 50% of a manufacturer's models offered for sale effective July 1, 2005; 100% of such models effective July 1, 2006.
- o With screen sizes 13 to 24 inches -- 100% of a manufacturer's models offered for sale effective July 1, 2007.
- **As to the above**, screen sizes are to be measured diagonally across the picture viewing area. These screen sizes are stated in the dimensions applied to screen sizes with a traditional **4:3** aspect ratio. When applied in different aspect ratios, the applicable screen size is determined by the vertical measurement. For example, the requirements for a 13" screen size with a **4.3** aspect ratio apply to a DTL' receiver with a 7.8" vertical measurement and a 16.9 aspect ratio.

### 3.6.2 MSO Commitments:

- 3.6.2.1 Under the recommended FCC regulations, the following will apply to MSOs. Effective July 1, 2005, when provisioning HD set-top-boxes (STB), MSOs must include both DVI/HDMI with copy protection and IEEE 1394 with copy protection (including software support) as described in Section 3.8. Effective December 31, 2003, upon request of a customer, MSOs will replace any leased high definition set-top box, which does not include a functional IEEE 1394 interface, with one that includes a functional IEEE 1394 interface or upgrade the customer's set-top box by download or other means to ensure that the IEEE 1394 interface is functional. If the consumer has a HD STR with DVI, but not 1394, and does not want a box with a 1394 interface, the customer may retain his current STB. MSOs need not exchange a deployed STB unless the consumer wants one with a 1394 interface. MSOs will replace any deployed HD STB with a DVI connector with one with DVI and 1394.
- 3.6.2.2 With regard to the replacement of a deployed HD STB with DVI for one with DVI and 1394, the STB will be provided at no additional cost to customer if customer requests it. The MSO may charge, as appropriate, for delivery and installation of the new STB.
- 3.6.3 To allow for future flexibility, subject to joint approval of the Parties (and the FCC if, as proposed, the CE Manufacturers' obligation to include digital interfaces is embodied in regulation or legislation), future secure digital interfaces may be substituted for those detailed above.
- 3.6.4 CE Manufacturers shall provide in appropriate post-sale material that describes the features and functionality of the product, such as the owner's guide, the following language: "This digital television is capable of receiving basic analog, digital basic and digital premium cable television programming by direct connection to a cable system providing such programming. A security card provided by your cable operator is required to view encrypted digital programming. Certain advanced interactive digital cable services such as video-on-demand, cable operator enhanced program guide, and data enhanced television service may require the use of a set top

box. For more information contact your local cable operator." This notification information is to be made available in various product owner's guides and technical references. It is specifically agreed that CE Manufacturers need not provide retail or pre-sales consumer notification information and that such notification information need only be consumer post-sales in nature. CE Manufacturers will agree to an owner's guide index reference to "Digital Cable Compatibility," leading the consumer to the information in the owner's guide or technical reference material.

### 3.7. Interoperability Testing and Certification Requirements:

The Parties will jointly develop and mutually agree to a Test Suite for Unidirectional Digital Cable Product prototype testing by January 31, 2003

Each CE Manufacturer will bring a prototype of its first POD-enabled Unidirectional Digital Cable Television to CableLabs or to an appropriately qualified third-party test facility to execute the Test Suite. CE Manufacturers shall remedy all Critical Test failures and retest at CableLabs or an appropriately qualified third-party test facility. CE Manufacturers may independently determine how to remedy Non-critical Test failures and may remedy them without retesting of the product at CableLabs or an appropriately qualified third-party test facility. CE Manufacturers shall submit First Prototype Test Suite Results and Self-Certification Documentation to CableLabs. For POD-enabled Unidirectional Digital Cable Televisions developed after the first model, CE Manufacturers will submit Self-Certification Documentation to CableLabs.

If the CE Manufacturer's first model is not a Television, the CE Manufacturer will bring a prototype of said model to CableLabs or an appropriately qualified third-party test facility to execute the Test Suite. CE Manufacturers shall remedy all Harm Prevention Test failures and retest at CableLabs or an appropriately qualified third-party test facility. CE Manufacturers may independently determine how to remedy all other test failures and may remedy them without retesting of the product at CableLabs or an appropriately qualified third-party test facility. CE Manufacturers shall submit Harm Prevention Test Results and Self-Certification Documentation to CableLabs.

After delivering Self-Certification Documentation and First Prototype Test Suite Results for a first prototype Unidirectional Digital Cable Television, CE Manufacturers have no further obligation to test at CableLabs or third-party test facilities. It is envisioned that manufacturers will be issued POD technology secrets in bulk under logistics to be determined by the Parties, for both pre-production testing and mass production, and can begin applying these secrets to POD-enabled televisions upon issuance of the Self-Certification Documentation. The requirements for interoperability and self-certification have been developed and are part of the technical regulations recommended for FCC adoption. CE Manufacturers agree that all Unidirectional Digital Cable Products shall meet the interoperability and self-certification requirements set forth in such technical regulations (which are enclosed as part of this package), or CE Manufacturers will lose their right to receive keys for the non-compliant product. CE Manufacturers will, upon reasonable request and subject to a mutually agreeable non-disclosure agreement, provide summary reporting to CableLabs of the identification of Host IDs and secrets with particular POD unit assemblies and such additional information as will reasonably

allow CableLabs and Cable Operators (through CableLabs), based upon the Host ID of a Unidirectional Digital Cable device, to identify other similar devices by model or production lot reporting. CE Manufacturers will cooperate with CableLabs in defining and using numbering systems that will permit such ready identification. It is acknowledged that such reporting need not be so detailed as to show the application of a specific secret to a specific serial numbered product.

3.8. Obligations of MSOs (as specified in the recommended FCC regulations which are enclosed as part of this package):

3.X.1. MSOs will provision all digital cable systems in accordance with the requirements of this section in order to support Unidirectional Digital Cable Products, as follows. The requirements described below are embodied in proposed rules (which are enclosed as part of this package) that the Parties are submitting to the FCC for implementation.

3.8.2 No later than July 1, 2004, cable operators shall support Unidirectional Digital Cable Products through the provisioning of PODs and services, as follows

3.8.2.1. Digital cable systems with an activated channel capacity of 750 MHz or greater shall comply with:

3.8.2.1.1. SCTE 40 2001, as amended by DVS/535 (as of 10/29/02), provided however that with respect to Table B.11, the Phase Noise requirement shall be -86 dB/Hz, and also provided that the "transit delay for the most distant customer" requirement in Table B.3 is not mandatory.

3.8.2.1.2. ANSVSCTE 65 2002 (as of 10/29/02), provided however that the referenced Source Name Subtable shall be provided for Profiles 1, 2, and 3.

3.8.2.1.3. ANSI/SCTE 54 2002, as amended by DVS/435r4 (as of 10/29/02).

3.8.2.1.4. Without limiting the above requirements, cable operators shall also implement the terms of the Feb. 2000 NCTA/CEA PSIP agreement (which is enclosed as part of this package).

3.8.2.2. All digital cable systems shall comply with:

3.8.2.2.1 ANSI/SCTE 28 2001, as revised by DVS/519r2 (as of 11/05/02)

3.8.2.2.2. ANSI/SCTE 41 2001, as amended by DVS/301r4 (as of 10/29/02).

3.8.3. MSOs shall:

3.8.3.1. Effective December 31, 2003, upon request of a customer, replace any leased high definition set-top box, which does not include a functional IEEE 1394 interface, with one that includes a functional IEEE 1394 interface or upgrade the customer's set-top box by download or other means to ensure that the IEEE 1394 interface is functional.

3.8.3.2. Effective July 1, 2005, include both a DVI or HDMI interface and an IEEE 1394 interface on all high-definition set-top boxes acquired by a cable operator for distribution to customers.

3.8.3.3. Ensure that these cable operator-provided High Definition Set-top boxes shall comply with ANSI/SCTE 26 2001 (as of 10/29/02) with transmission of bit-mapped graphics (EIA-799) optional, and shall support the CEA-931-A PASS THROUGH control commands: rune function, mute function, and restore volume function. In addition these boxes shall support the POWER control commands (power on, power off, and status inquiry) defined in A.V.C.



Digital Interface Command Set General Specification Version 4.0 (as referenced in ANSVSCTE 26 2001).

- 3.8.3.4 After July 1, 2004, provide PODs to consumers coincident to CE Manufacturers product roll-outs, in sufficient quantity and convenience to ensure access for consumers. PODs that are more advanced than the ANSI standard may be provided as long as these PODs do not impact services and features available from existing PODs and are fully interoperable.

3.9 Additional MSO commitments:

- 3.9.1 MSOs will offer to educate local retailers regarding the capability of the local cable system to support Unidirectional Digital Cable Products.
- 3.9.2 MSOs will offer to provide a digital set-top box to the consumer if the Unidirectional Digital Cable Product does not work because the local cable system does not support Unidirectional Digital Cable Products.
- 3.9.3 MSOs will update Go2Broadband and develop a means for both CEA and CE Manufacturers to get access to Go2Broadband to identify systems that support Unidirectional Digital Cable Products in the manner provided by Section 3.8.2.
- 3.9.4 MSOs will provide CE Manufacturers with head-end configuration information and hardware profiles used in head-ends. In the event that head-end equipment vendors restrict access to equipment necessary for manufacturer and third-party testing organizations, MSOs will use commercially reasonable efforts to facilitate the purchase of head-end equipment by CE Manufacturers. Alternatively, MSOs will arrange for CableLabs to make its testing facilities (or optionally MSO facilities) available on fair, reasonable, and non-discriminatory terms.
- 3.10 With respect to encoding rules, the Parties agree to contact the DTLA to discuss the subject of potential infringement claims that could arise as a result of differences between the encoding rule proposal contemplated by this MOU and the "5C" encoding rules.
- 3.11 MSOs and CE Manufacturers acknowledge that technology advances and certain standards may need to transition or sunset. MSO and CE Manufacturers will meet at least annually to discuss technology sunsets, and may submit recommendations to the FCC as part of the biennial review process, or such earlier review as may be appropriate.
- 3.12 The design of Unidirectional Digital Cable Products may not impose additional investment requirements on the cable distribution network, beyond MSO obligations specified in this MOU.
- 3.13 This agreement authorizes the revocation of the POD for products which do not adhere to the compliance and robustness rules as specified in the DFAST License Agreement.

**4. Advanced Interactive Digital Cable n (n = TV, Tuner. etc) Product Definition (This is a two-way product)**

Both MSOs and CE Manufacturers agree to continue to work together to create appropriate specifications, technical descriptions and labeling/information requirements for Advanced Interactive (two-way) Digital Cable Products.

- 4.1. The Parties **will** agree upon a recognized term for the advanced interactive digital cable products in summary form. The Parties will discuss whether there should be a requirement to mark product in any way with this name, but both MSOs and CE Manufacturers are encouraged to use this name to promote consumer awareness.
- 4.2. Interoperability Testing and Certification Requirements: Because of the complexity of this type of product, CE Manufacturers agree to a higher level of compliance, and of interoperability testing, leading to self-certification; **CE** Manufacturers will participate in prototype testing and development of interoperability test suites; further details subject to continued discussion.
- 4.3. Cable operators' EPC **will** be provided for advanced interactive digital cable products via OCAP or its successor technology.

The understandings set forth herein represent the understandings in principle of the Parties with respect to the matters specified therein. The Parties acknowledge that such understandings that have not been reduced to agreements submitted herewith will be set forth in further detail in subsequent documents to be negotiated by the Parties. It is understood that this MOU shall be construed only as a memorandum of understanding summarizing the discussions between the Parties.

**Recommended Regulations to Ensure Compatibility Between  
Digital Cable Systems and Unidirectional Digital Cable Products and to  
Provide for Appropriate Labeling of Such Products.**

**Subpart \_\_\_\_ -- Compatibility Between Digital Cable Systems and Unidirectional Digital  
Cable Products and Labeling.**

**§ \_\_\_\_ Support For Plug and Play Operation of Unidirectional Digital Cable Products  
On Digital Cable Systems.**

- (a) The requirements of this section shall apply to digital cable systems.
- (b) No later than July 1, 2004, cable operators shall support Unidirectional Digital Cable Products, through the provisioning of PODs and services, as follows:
  - (I) Digital cable systems with an activated channel capacity of 750 MHz or greater shall comply with:
    - (i) SCTE 40 2001, as amended by DVS/535 (as of 10/29/02), provided however that with respect to Table B.11, the Phase Noise requirement shall be -86 dB/Hz, and also provided that the "transit delay for most distant customer" requirement in Table B.3 is not mandatory
    - (ii) ANSI/SCTE 65 2002 (as of 10/29/02), provided however that the referenced Source Name Subtable shall be provided for Profiles 1, 2, and 3.
    - (iii) ANSVSCTE 54 2002, as amended by DVS/435r4 (as of 10/29/02).
    - (iv) Without limiting the above requirements, cable operators shall also implement the terms of the Feb. 2000 NCTA/CEA PSIP agreement, attached as Appendix A
- (2) **All** digital cable systems shall comply with:
  - (i) ANSI/SCTE 28 2001, as amended by DVS/519r2 (as of 11/5/02).
  - (ii) ANSI/SCTE 41 2001, as amended by DVS/301r4 (as of 10/29/02).
- (3) Cable operators shall ensure, as to all digital cable systems, an adequate supply of PODs that comply with the standards specified in Section (b)(2) to ensure convenient access to such PODs by customers. Without limiting the foregoing, cable operators may provide more advanced PODs

(i.e., **PODs** that are based on successor standards to those specified in Section (b)(2)) to customers whose Unidirectional Digital Cable Products are compatible with the more advanced PODs.

**(4) Cable Operators shall:**

(i) Effective December 31, 2003, upon request of a customer, replace any leased high definition set-top box, which does not include a functional IEEE 1394 interface, with one that includes a functional IEEE 1394 interface or upgrade the customer's set-top box by download or other means to ensure that the IEEE 1394 interface is functional.

(ii) Effective July 1, 2005, include both a DVI or HDMI interface and an IEEE 1394 interface on all high definition set-top boxes acquired by a cable operator for distribution to customers.

(iii) Ensure that these cable operator-provided High Definition Set-Top Boxes shall comply with ANSL'SCTE 26 2001 (as of 10/29/02) with transmission of bit-mapped graphics (EIA-799) optional, and shall support the CEA-931-A PASS THROUGH control commands: tune function, mute function, and restore volume function. In addition these boxes shall support the POWER control commands (power on, power off, and status inquiry) defined in A/VC Digital Interface Command Set General Specification Version 4.0 (as referenced in ANSL'SCTE 26 2001)

(5) The Commission will review the standards in this Section on a biennial basis to determine whether any of the regulations adopted herein shall sunset and/or be amended in light of changes in technology or other public interest factors

**§ —. — Unidirectional Digital Cable Products.**

(a) The requirements of this section shall apply to Unidirectional Digital Cable Products. Unidirectional Digital Cable Products are one-way devices which include, but are not limited to televisions, set-top-boxes and recording devices, connected to digital cable systems.

(b) A Unidirectional Digital Cable Compatible Television may not be labeled or marketed as "XXX" [XXX="Digital Cable Compatible" or an alternative term to be defined jointly at a later date)] or otherwise marketed as defined below, unless it implements at a minimum the following features. Use of a label to mark the product physically is voluntary. For purposes of this section, "marketed" means using the descriptive terms specified in these rules, or using terminology that describes the device as "cable ready" or "cable compatible," marketing or otherwise indicating the device accepts a POD or that otherwise conveys the impression that the device is compatible with digital cable service.

- (1) Tunes NTSC analog channels that are transmitted in-the-clear.
  - (2) Tunes digital channels that are transmitted in compliance with SCTE 40 2001 as amended by DVS/535 (as of 10/29/02), provided, however, that with respect to Table B.11, the phase noise requirement shall be -86 dB/Hz including both in-the-clear channels and channels that are subject to conditional access.
  - (3) May navigate channels based on (i) channel information (virtual channel map and source names) provided through the cable system in compliance with ANSVSCTE 65 2002 (as of 10/29/02) and/or (ii) PSIP-enabled navigation (SCTE 54 2002 as amended by DVS/435r4 (as of 10/29/02)
  - (4) Includes the POD-Host Interface specified in SCTE 28 2001 as amended by DVS/519r2 (as of 11/5/02) and SCTE 41 2001 as amended by DVS/301r4 (as of 10/29/02) or implementation of a more advanced POD-Host Interface based on successor standards. Support for IP flows is not required.
  - (5) Responds to Emergency **Alerts** that are transmitted in compliance with ANSVSCTE 54 2002, as amended by DVS/435r4 (as of 10/29/02).
- (c) In addition to the above requirements, a Unidirectional Digital Cable Compatible Television may not be labeled or marketed either as ["XXX" or "XXX plus YYY"] or otherwise marketed as defined above, unless it employs specified interfaces at a minimum in accordance with the following schedule, provided however that there is no such obligation to incorporate the specified interfaces until there is federal regulation or enactment of a federal law adopting encoding rules and prohibiting selectable output controls
- (1) For 480p grade Unidirectional Digital Cable Compatible Televisions – as follows (either DVI/HDCP or HDMI/HDCP interfaces, or 480p Y,Pb,Pr interfaces):
    - (i) With screen sizes 36 inches and above – 50% of a manufacturer's models offered for sale effective July 1, 2004; 100% of such models effective July 1, 2005
    - (ii) With screen sizes 32 to 35 inches – 50% of a manufacturer's models offered for sale effective July 1, 2005; 100% of such models effective July 1, 2006.
  - (2) For 720p/1080i (HD) grade Unidirectional Digital Cable Compatible Televisions – as follows (either DVI/HDCP or HDMI/HDCP interfaces)

(i) With screen sizes **36** inches and above – 50% of a manufacturer's models offered for sale effective July 1, 2004; 100% of such models effective July 1, 2005.

(ii) With screen sizes 25 to 35 inches – 50% of a manufacturer's models offered for sale effective **July 1, 2005**; 100% of such models effective July 1, 2006.

(iii) With screen sizes 13 to **24** inches – 100% of a manufacturer's models offered for sale effective **July 1, 2007**.

(3) For purposes of this section, screen sizes are to be measured diagonally across the picture viewing area. These screen sizes are stated in the dimensions applied to screen sizes with a traditional 4:3 aspect ratio. When applied to different aspect ratios, the applicable screen size is determined by the vertical measurement. For example, the requirements for a 13" screen size with a 4:3 aspect ratio apply to a DTV receiver with a 7.8" vertical measurement and a 16:9 aspect ratio.

(d) Before a manufacturer's first Unidirectional Digital Cable Compatible Television may be labeled or marketed (as the term "marketed" is defined at subsection \_\_\_(b) above) as ["XXX" or "XXX plus YYY,"] a manufacturer shall self-certify according to the following definitions and procedures.

(1) Definitions:

(i) Test Suite is the set of tests jointly developed and mutually agreed by CableLabs and CEA that can be directly attributed to an applicable normative requirement of one or more of the following standards: SCTE 28 2001 as amended by DVS/519r2 (as of 11/5/02), SCTE 41 2001 as amended by DVS/301r4 (as of 10/29/02), or SCTE 40 2001 as amended by DVS/535 (as of 10/29/02) or portions of EIA-818D and DVS/538 (as of 10/29/02) that specifically address items **(A)** through **(G)** of the definition of Critical Test.

(ii) Critical Test is a test in the Test Suite that is essential to ensure the device under test **(A)** can tune and display **(TV products)** scrambled digital services via the POD conditional access system, **(B)** will not technically disrupt, impede or impair delivery of services to cable subscribers, **(C)** will not cause physical harm to the cable network or the POD, **(D)** will not facilitate theft of service or otherwise interfere with reasonable actions taken by Cable Operators to prevent theft of service, **(E)** will not jeopardize the security of any services offered over the cable system; **(F)** will not interfere with or disable the ability of a Cable Operator to communicate with or disable a POD Module or to disable services being transmitted through a POD Module, or **(G)** will not impede or impair control of content protection. **All** other tests are called Non-critical Tests.

(iii) Harm Prevention Test is a test in the Test Suite that shall include appropriate portions of EIA-818D and DVS 538 (as of 10/29/02) that specifically address items (B) through (G) of the definition of Critical Test.

(iv) Self-Certification Documentation is an affirmative statement by the manufacturer that a Unidirectional Digital Cable Television Product model has been tested and has passed the Test Suite.

(v) First Prototype Test Suite Results are the passing results of all Critical Tests in the Test Suite and the results of all tests in the Test Suite for the manufacturer's first model of a Unidirectional Digital Cable Television.

(2) The manufacturer shall bring a prototype of its first model Unidirectional Digital Cable Television Product to CableLabs or an appropriately qualified third-party test facility to execute the Test Suite. Manufacturer shall remedy all Critical Test failures and retest at CableLabs or an appropriately qualified third party test facility. Manufacturer may independently determine how to remedy Non-critical Test failures and may remedy them without retesting of the product at CableLabs or an appropriately qualified third-party test facility. Manufacturer shall submit First Prototype Test Suite Results and Self-Certification Documentation to CableLabs.

(3) For models of a Unidirectional Digital Cable Television Product after the first model, manufacturer shall submit Self-Certification Documentation to CableLabs.

(4) If the manufacturer's first model Unidirectional Digital Cable Product is not a Television, or if the manufacturer's first model Unidirectional Digital Cable Product (whether or not it is a Television) is placed onto the market without being marketed (as the term "marketed" is defined at subsection \_\_\_(b) above) or labeled as "XXX" or "XXX plus YYY," the manufacturer shall bring a prototype of said model to CableLabs or an appropriately qualified third-party test facility to execute the Test Suite. Manufacturer shall remedy all Harm Prevention Test failures and retest at CableLabs or an appropriately qualified third party test facility. Manufacturer may independently determine how to remedy all other test failures and may remedy them without retesting of the product at CableLabs or an appropriately qualified third-party test facility. Manufacturer shall submit Harm Prevention Test Results and Self-Certification Documentation to CableLabs.

(5) After delivering Self-Certification Documentation and First Prototype Test Suite Results for a first prototype Unidirectional Digital Cable

Television, manufacturers have no further requirement to test at CableLabs or third-party test facilities.

(e) Manufacturers shall provide in appropriate post-sale material that describes the features and functionality of the product, such as the owner's guide, the following language: "This digital television is capable of receiving analog basic, digital basic and digital premium cable television programming by direct connection to a cable system providing such programming. A security card provided by your cable operator is required to view encrypted digital programming. Certain advanced and interactive digital cable services such as video-on-demand, a cable operator's enhanced program guide and data-enhanced television services may require the use of a set-top box. For more information call your local cable operator."

(f) The Commission will review the standards in this Section on a biennial basis to determine whether any of the regulations adopted herein shall sunset and or be amended in light of changes in technology or other public interest factors.



# Carriage of PSIP over Cable Plants

## 1. Purpose and Scope

The purpose of this paper is to address issues related to the carriage of PSIP data over cable plants. This paper represents an agreement between the Consumer Electronics Association (CEA) and the National Cable Television Association (NCTA) on carriage of PSIP on cable in support of consumer digital receiving devices (digital receivers) connected directly to the cable TV system. It is also our view that the proposal described here represents an implementable solution that will add value to our collective customer base. In order to ensure that we have agreement on the implementation of PSIP, this paper details the requisite conditions necessary to carry PSIP on cable plants. Further work is needed on detailed aspects of the implementation.

Section 2 outlines a number of technical requirements regarding carriage of PSIP data on cable. Section 3 discusses implementation issues and outlines various scenarios involved in cable signal distribution at cable headends and at uplink centers such as HITS and Athena.

## 2. Requirements

The following requirements are based on the availability of PSIP data from the content provider. These requirements are aimed at the *carriage* of PSIP through the distribution chain and not its creation.

MSO's will require customers to obtain POD modules to receive scrambled digital services. For a consumer-owned digital receiver directly connected to the cable plant, we state the following requirements regarding PSIP data:

1. A map of all available audio/video services shall be made available to the digital receiver.
  - a. Any given digital receiver may or may not include a functioning POD module at any given time. Therefore, if a digital Transport Stream (TS) includes one or more services carried in-the-clear, that TS shall include virtual channel data in-band in the form of ATSC A/65 (PSIP) and SCTE DVS-097 Rev 7 (once it is harmonized with ATSC A/65). The in-band data shall at minimum describe services carried within the Transport Stream carrying the PSIP data itself.
  - b. A virtual channel table shall be provided out-of-band via the Extended Channel interface from the POD module. Tables to be included shall conform to SCTE DVS 234r1.
2. Each channel shall be identified by a one- or two-part channel number and a textual channel name (for example: "ESPN").

3. PSIP data describing a twelve-hour time period shall be carried for each service in the **transport** stream. This twelve-hour period corresponds to **delivery of the following** Event Information Table (EIT) EIT-0, -1, -2 and -3 (or the equivalent data delivered out-of-band). This requirement inatches those already in place for digital **terrestrial** broadcast. The total bandwidth for PSIP data may **be** limited by the MSO to 80 Kbps for a 27 **Mbits** multiplex and 115 Kbps for a 38.8 Mbits multiplex.
4. Carriage of descriptive **text** in the form of PSIP Extended Text Tables (ETTs) is desirable but optional.
5. Event information **data** may be transported **either** in-band or out-of band. When sent in-band, Event information data format shall conform to ATSC A/65 PSIP and SCTE DVS-097 Rev. 7 (once it is harmonized with ATSC A/65). When sent out-of-band, event information data shall conform to SCTE DVS 234-r1 (profiles 4 or higher). In-band data may be used by the digital receiver to **augment** event information data sent out-of-band. In other words, both in-band and out-of-band data may be present to describe certain services. The digital **receiver** may collect and use data **from both sources** (with rules for use of the **channel** numbers noted).
6. If a reference is made in in-band PSIP to an analog channel, the digital receiver shall use the **Transmission Signal ID** method to unambiguously link the PSIP data to the **analog service** (see EIA-752). An analog feed shall include the EIA-752 **TSID** when PSIP data for that feed is present on an available digital feed. The digital receiver shall not use PSIP data referencing an analog channel unless a matching **TSID** is found in the analog feed.
7. The channel number identified with out-of-band SI data may or may not match the channel number identified with in-band PSIP data, for all scrambled services. The digital receiver shall use the channel numbers found in the out-of-band SI if a POD module is present.
8. The channel number identified with out-of-band SI data should match the channel number identified with in-band PSIP data, for all unscrambled (in-the-clear) services. This is desirable so that a digital receiver with no POD module installed will label a **service** the same as one with a POD module present. This may not be possible for all system architectures.

### 3. Implementation Scenarios

#### 3.1. PSIP in Multiplex

The most fundamental requirement for the MSO is to ensure that if PSIP exists within a multiplex, that it is not stripped from the multiplex and is carried on the cable plant without modification. Figure 1 represents the scenario in which a cable headend downlinks a digital multiplex such as Viewer's Choice utilizing an IRT (integrated receiver transcoder). In this scenario, Viewer's Choice contains PSIP data that was

created and inserted into the multiplex by Viewer's Choice. In this scenario, the PSIP is simply passed through to the cable plant without modification. Each cable headend has the freedom to up-convert the multiplex to any physical channel. Enough information exists in the digital receiver (from inband PSIP and the Virtual Channel Table) to reconstruct the virtual channel number for each program in the multiplex. To this end, we believe that no changes are necessary to support the passthrough of PSIP on to the cable plant

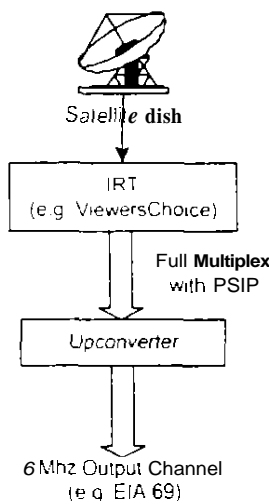


Figure 1. PSIP data on the incoming multiplex is passed through to the cable plant. The PSIP is not and does not have to be modified.

### 3.2. Content Re-Encoding

A number of content providers, such as HITS and Athena, create customized multiplexes by using content from multiple sources. Figure 2 depicts the scenario in which a number of IRD's are used to receive programs from multiple content providers. Presently, the baseband outputs of the IRD's are fed into the uplink encoder to create a customized multiplex. The Uplink Control System (UCS) is used to set the encoding parameters of each of the programs as well as to assign MPEG services numbers.

In order for PSIP to be correctly carried in the new multiplex, a number of issues need to be addressed. Presently, IRD's do not have a means of extracting PSIP. IRD's simply received and decrypt a given program. It should not prove to be difficult to build an IRD that would extract the PSIP data once the system requirements for this device have been developed. After the PSIP data is extracted from the IRD's, the data needs to be fed into a PSIP aggregator. The purpose of the PSIP aggregator is to coordinate all of the PSIP data and ensure that there are no collisions between the input PSIP streams.

Presently, a PSIP aggregator does not exist, but in principal this can be done and we do not expect there to be any fundamental technical hurdles. We do believe that an appropriate system design is needed before the IRD and aggregator can be built. In

addition, we believe that modifications will be required of the UCS and/or Encoder to support the insertion of the aggregated PSIP stream. The cable industry has begun to discuss with potential vendors the requirements for such devices.

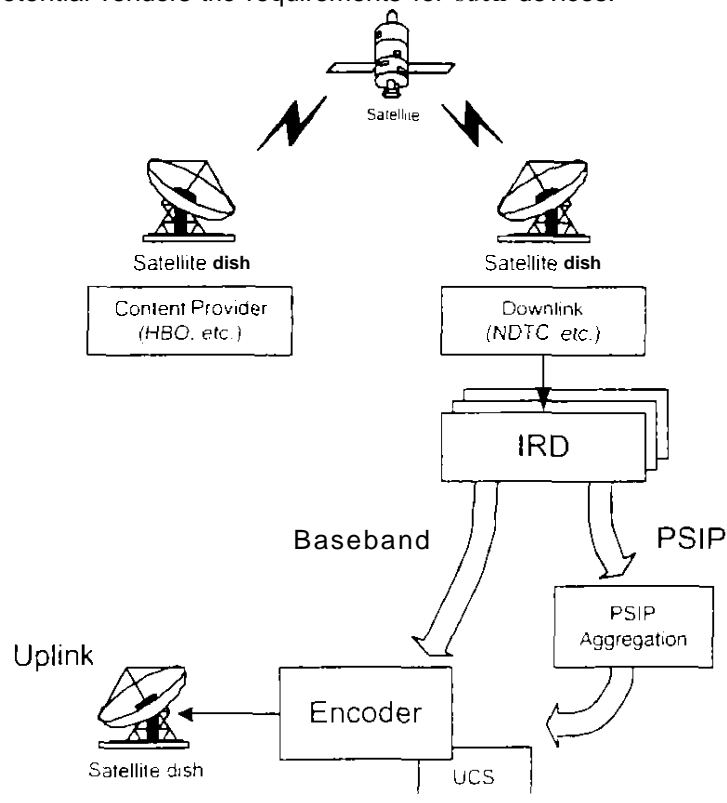


Figure 2. Content re-encoding is used to create custom multiplexes. In order to insert PSIP from each of the programs into the new multiplex, PSIP aggregation will have to be performed.

PSIP data may be present within the downlinked NTSC analog signal. The EIA-806 standard may be used to transmit PSIP data in XDS data packets in the VBI. If so, the PSIP aggregator function in Figure 2 will be designed to accept PSIP in either A 65 or EIA-806 formats, to accommodate digital or analog incoming feeds.

### 3.3. Content Provider PSIP Creation

In general, uplink providers uplink multiple services for multiple content providers. As an example, AT&T's National Digital Television Center (NDTC) houses playback and editing facilities for the Discovery Channel and Encore, just to name two. Once these content providers source program data for inclusion into PSIP, a means is needed to inject the PSIP into the uplink encoders. Figure 3 schematically depicts a scenario in which an interface is available to the content providers in which program data can be delivered to a PSIP generator. The PSIP generator would in turn create the PSIP stream that would be inserted into the transport multiplex.

Implementation in this scenario requires that an interface specification be developed that provides for a convenient method for content providers to supply program data. A PSIP generator needs to be developed to take program data and create the PSIP stream. The PSIP generator could be the same device used in the previous example to aggregate PSIP. Once created, the PSIP would be inserted into the transport multiplex. We believe that modifications will be needed to the UCS and/or Encoder to support the insertion of the PSIP stream. As in the previous scenarios, we do not see any fundamental technical hurdles, rather the need for a coordinated end-to-end system design.

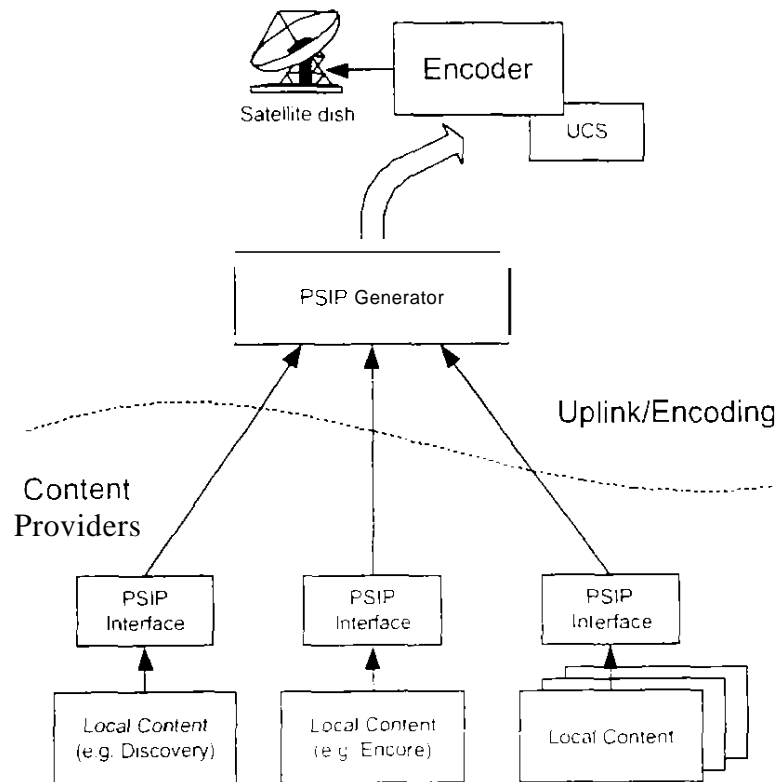


Figure 3. Content providers would transmit program data via the PSIP interface. This data would be used to create the PSIP for the multiplex.

### 3.4. Remultiplexing

Remultiplexing devices are becoming increasingly popular in order to optimize the use of plant bandwidth. A typical case is where an MSO would like to use one or more programs from one multiplex and combine these programs with one or more programs from another multiplex. Two companies (Terayon and VBITS) presently offer remultiplexing solutions. These products "fix" system information so that service numbers and PIDs are unique within the new multiplex. In order to support the carriage of PSIP, the remultiplexing unit would have to aggregate and coordinate PSIP from multiple sources. Figure 4 depicts this scenario. Remultiplexing units will require modifications to support coordination of PSIP, but we believe that there are no technical

issues that would prohibit this feature from being included into future remultiplexers. Discussions with remultiplexing equipment vendors have begun in order to ensure that they have taken PSIP into consideration for future equipment designs.

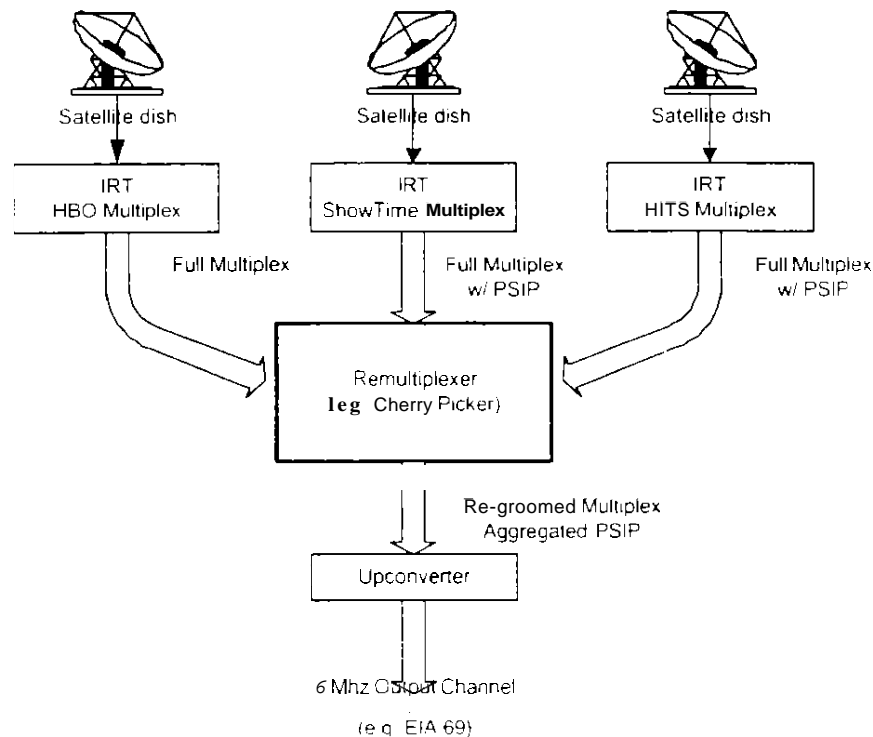


Figure 4. Remultiplexing units will need to aggregate and coordinate PSIP from multiple input sources.

### 3.5. Master Downlink, Multiple Channel Maps

A number of cable systems (including AT&T and Shaw) utilize a plant architecture in which there is a Master Downlink IRT feeding multiple channel maps. Figure 5 depicts such a scenario. As an example, the Denver Mile High headend provides cable service to Boulder, Littleton and Castle Rock, CO. Each of these local entities employ different channel maps. Thus the in-band PSIP virtual channel number may be irrelevant. Similarly, terrestrial DTV PSIP may not reflect the virtual channel that the broadcast is carried on in the cable plant.

According to requirement #8, "The channel number identified with the out-of-band SI data should match the in-band channel number identified with the in-band PSIP data, for all unscrambled services." Since it is our position that digital cable programs will be scrambled, there should not be a problem satisfying this requirement. The only possible exception to this is carriage of terrestrial DTV content. We believe that the best approach to satisfying this requirement is to have local coordination with terrestrial broadcasters. We have not worked through all of the scenarios relative to terrestrial content, such as

two-part channel numbers, but believe that we can develop operational guidelines to ensure that the consumer is provided consistent information across multiple platforms

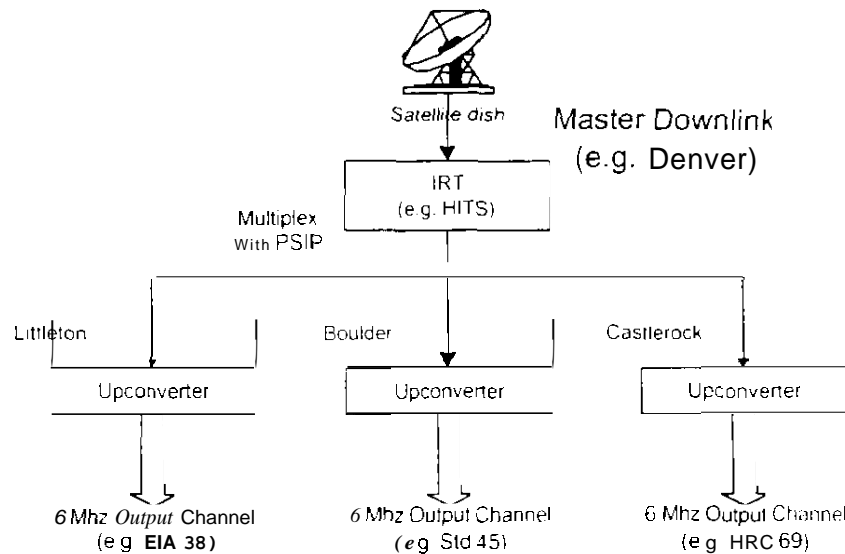


Figure 5. In many instances, a Master Downlink is used to feed multiple headends, thus the in-band PSIP virtual channel number may be irrelevant. Similarly, terrestrial DTV PSIP may not reflect the virtual channel that the broadcast is carried on the cable plant.

#### 4. Implementation Plan

The steps necessary to achieve the requirements set forth above include:

- Systems Engineering
- Product Development
- Product Qualification
- Procurement
- Systems Integration
- Infrastructure buildout
- System Acceptance Testing

The NCTA believes that this process can be completed in a timely fashion, but will require the active participation of PSIP equipment vendors, content providers (e.g. HBO), cable operators, and consumer electronics manufacturers

## 5. Conclusions

The NCTA and the CEA have reached an agreement on the carriage of PSIP for cable. We believe that this implementation *of* PSIP will add value to the cable offering. In addition, we believe that carriage of PSIP **will** speed the acceptance of DTV and the associated digital receivers.

A number of issues need to be resolved and system components **need** to be designed in order to fully implement the system described here. The NCTA is committed to working with the CEA to add further detail to the component specifications. In addition, equipment vendors will **be** engaged as soon as possible to solicit them for hardware solutions [that satisfy the requirements for carriage of PSIP